

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for discovering a trust chain, wherein the trust chain comprises at least ~~comprising~~ attribute delegations each with an issuer and a subject, ~~that~~ overall imparts a required attribute to a subject, and is grounded in a known trusted issuer, ~~the method involving the use of and~~ wherein certificates are used as justification of associated attribute delegations ~~and , the method comprising the steps of:~~

- a) setting as a primary goal to be proved an attribute delegation from a known trusted issuer to said subject;
- b) seeking a backwards proof of said primary goal by a process of recursively taking a goal to be proved, starting with said primary goal, and decomposing it into subgoals one of which corresponds to an attribute delegation that is justified by an available certificate and has the same subject as the goal being decomposed, inability to decompose a subgoal that has not been proved causing the process to backtrack to a previous subgoal to seek a new decomposition of the latter; and
- c) determining that a trust chain has been found upon the process of ~~step~~ (b) producing a chain of subgoals that is proved by corresponding certificates [[,]] and that grounds in a subgoal justified by a justified attribute delegation that has as issuer the said known trusted issuer included in said primary

goal.

2. (currently amended) A method according to claim 1, wherein the known trusted issuer included in said primary goal is a specifically identified entity that is inherently trusted by the discovery method at least in relation to said required attribute, said justified attribute delegation ~~of step (e)~~ being an attribute delegation that is justified by a corresponding certificate.

3. (currently amended) A method according to claim 1, wherein the known trusted issuer included in said primary goal is the discovery method itself; said justified attribute delegation ~~of step (e)~~ being an attribute delegation that is justified either by an axiom inherently trusted by the discovery method, or by a corresponding certificate.

4. (original) A method according to claim 3, wherein the discovery method, as said known trusted issuer, is represented in said primary goal and said axiom as a null issuer.

5. (currently amended) A method according to claim 1, wherein name mappings justified by corresponding certificates are permitted in a said trust chain in addition to attribute delegations, and wherein the process of step (b) involving further comprises:

decomposing, as appropriate, a particular subgoal to be proved into a name mapping justified by an available certificate and a new subgoal corresponding to said particular subgoal but with the subject reverse mapped using said name mapping.

6. (currently amended) A method according to any one of the preceding claims, ~~including as part of step (b)~~ wherein seeking a backwards proof further comprises:

maintaining a list of subgoals already generated and pursued, checking each new subgoal against said list, and terminating the process of ~~step (b)~~ seeking of a backwards proof in failure in the event of a new subgoal being found to already exist in the list.

7. (currently amended) A method according to any one of the preceding claims, wherein at least some of said certificates used in proving a ~~said~~ determined trust chain ~~determined in step (e)~~ as found have associated validity data, the method ~~involving~~ comprising the further step of traversing the trust chain in a forwards direction from the trusted attribute delegation that grounds it and combining the validity data of all certificates involved to determine the validity of the overall attribute delegation represented by the chain.

8. (currently amended) A method according to claim 7, wherein ~~step (e) involves~~ determining that a trust chain has been found

comprises storing the state of the ~~process of step (b)~~ seeking of a backwards proof prior to checking the validity of the trust chain found, this state being used to continue the process should the check of the validity of the initially found chain show that the chain is not valid.

9. (currently amended) A method according to any one of the preceding claims, wherein an attribute-delegation certificate used to prove a said subgoal has a subject-directed condition associated with it requiring that a specified subject must have a particular attribute in order for the delegation to be valid, and wherein the process of step (b) involving further comprises:

making ~~this~~ said subject-directed condition a further subgoal to be proved for the current chain being followed.

10. A method according to claim 1, wherein the process of step (b) is run to completion to find all trust chains, if any, proving the primary goal.

11. (currently amended) A method of selecting certificates to be sent to a resource which requires proof that a subject has a particular attribute before allowing use of the resource, ~~this method involving carrying out~~ comprising:

finding a trust chain by the method of any one of claims 1 to 7 in respect of said subject and an issuer known, or likely, to be trusted by said resource; and

selecting for sending to said resource ~~the~~ certificates
~~selected for sending to said resource being those~~ associated
with a trust chain, if any, thereby found.

12. (currently amended) A method of determining whether a
resource requiring a user to have at least one predetermined
attribute, is usable by a subject presenting certificates to the
resource, ~~this method involving carrying out~~ comprising:

finding a trust chain by the method of any one of claims 1
to 7 in respect of said subject and an issuer known and trusted
by said resource; and

determining that use of the resource by the subject is
permitted if a trust chain can be found.

13. (new) A system for discovering a trust chain, wherein
the trust chain comprises at least attribute delegations each
with an issuer and a subject, overall imparts a required
attribute to a subject, and is grounded in a known trusted
issuer, and wherein certificates are used as justification of
associated attribute delegations, the system comprising a
processor for:

setting as a primary goal to be proved an attribute
delegation from a known trusted issuer to said subject;

seeking a backwards proof of said primary goal by a process
of recursively taking a goal to be proved, starting with said
primary goal, and decomposing it into subgoals one of which

corresponds to an attribute delegation that is justified by an available certificate and has the same subject as the goal being decomposed, inability to decompose a subgoal that has not been proved causing the process to backtrack to a previous subgoal to seek a new decomposition of the latter; and

determining that a trust chain has been found upon producing a chain of subgoals that is proved by corresponding certificates and that grounds in a subgoal justified by a justified attribute delegation that has as issuer the said known trusted issuer included in said primary goal.

14. (new) A system according to claim 13, wherein the known trusted issuer included in said primary goal is a specifically identified entity that is inherently trusted at least in relation to said required attribute, said justified attribute delegation being an attribute delegation that is justified by a corresponding certificate.

15. (new) A system according to claim 13, wherein the known trusted issuer included in said primary goal is a discovery method of the system itself; said justified attribute delegation being an attribute delegation that is justified either by an axiom inherently trusted by the discovery method, or by a corresponding certificate.

16. (new) A system according to claim 15, wherein the

discovery method, as said known trusted issuer, is represented in said primary goal and said axiom as a null issuer.

17. (new) A system according to claim 13, wherein name mappings justified by corresponding certificates are permitted in a said trust chain in addition to attribute delegations, and wherein seeking a backwards proof further comprises:

decomposing, as appropriate, a particular subgoal to be proved into a name mapping justified by an available certificate and a new subgoal corresponding to said particular subgoal but with the subject reverse mapped using said name mapping.

18. (new) A system according to any one of claims 13-17, wherein seeking a backwards proof further comprises:

maintaining a list of subgoals already generated and pursued, checking each new subgoal against said list, and terminating the process of seeking a backwards proof in failure in the event of a new subgoal being found to already exist in the list.

19. (new) A system according to any one of claims 13-18, wherein at least some of said certificates used in proving a determined trust chain as found have associated validity data, the processor further for traversing the trust chain in a forwards direction from the trusted attribute delegation that grounds it and combining the validity data of all certificates

involved to determine the validity of the overall attribute delegation represented by the chain.

20. (new) A system according to claim 19, wherein determining that a trust chain has been found comprises storing the state of the seeking of a backwards proof prior to checking the validity of the trust chain found, this state being used to continue the process should the check of the validity of the initially found chain show that the chain is not valid.

21. (new) A system according to any one of claims 13-20, wherein an attribute-delegation certificate used to prove a said subgoal has a subject-directed condition associated with it requiring that a specified subject must have a particular attribute in order for the delegation to be valid, and wherein seeking a backwards proof further comprises:

making said subject-directed condition a further subgoal to be proved for the current chain being followed.

22. (new) A system according to claim 13, wherein the seeking of a backwards proof is run to completion to find all trust chains, if any, proving the primary goal.

23. (new) A system according to any one of claims 13-18, wherein said processor is further for selecting certificates to

be sent to a resource which requires proof that a subject has a particular attribute before allowing use of the resource by:

finding a trust chain in respect of said subject and an issuer known, or likely, to be trusted by said resource; and

selecting for sending to said resource certificates associated with a trust chain, if any, thereby found.

24. (new) A system according to any one of claims 13-18, wherein said processor is further for determining whether a resource requiring a user to have at least one predetermined attribute is usable by a subject presenting certificates to the resource, by:

finding a trust chain in respect of said subject and an issuer known and trusted by said resource; and

determining that use of the resource by the subject is permitted if a trust chain can be found.

25. (new) A computer program product for use in connection with a computer for discovering a trust chain, wherein the trust chain comprises at least attribute delegations each with an issuer and a subject, overall imparts a required attribute to a subject, and is grounded in a known trusted issuer, and wherein certificates are used as justification of associated attribute delegations, said computer program product comprising a computer-readable medium having encoded thereon instructions for:

setting as a primary goal to be proved an attribute delegation from a known trusted issuer to said subject;

seeking a backwards proof of said primary goal by a process of recursively taking a goal to be proved, starting with said primary goal, and decomposing it into subgoals one of which corresponds to an attribute delegation that is justified by an available certificate and has the same subject as the goal being decomposed, inability to decompose a subgoal that has not been proved causing the process to backtrack to a previous subgoal to seek a new decomposition of the latter; and

determining that a trust chain has been found upon producing a chain of subgoals that is proved by corresponding certificates and that grounds in a subgoal justified by a justified attribute delegation that has as issuer the said known trusted issuer included in said primary goal.

26. (new) A computer program product according to claim 25, wherein the known trusted issuer included in said primary goal is a specifically identified entity that is inherently trusted at least in relation to said required attribute, said justified attribute delegation being an attribute delegation that is justified by a corresponding certificate.

27. (new) A computer program product according to claim 25, wherein the known trusted issuer included in said primary goal is a discovery method itself; said justified attribute delegation being an attribute delegation that is justified

either by an axiom inherently trusted by the discovery method, or by a corresponding certificate.

28. (new) A computer program product according to claim 27, wherein the discovery method, as said known trusted issuer, is represented in said primary goal and said axiom as a null issuer.

29. (new) A computer program product according to claim 25, wherein name mappings justified by corresponding certificates are permitted in a said trust chain in addition to attribute delegations, and wherein seeking a backwards proof further comprises:

decomposing, as appropriate, a particular subgoal to be proved into a name mapping justified by an available certificate and a new subgoal corresponding to said particular subgoal but with the subject reverse mapped using said name mapping.

30. (new) A computer program product according to any one of claims 25-29, wherein seeking a backwards proof further comprises:

maintaining a list of subgoals already generated and pursued, checking each new subgoal against said list, and terminating the process of seeking a backwards proof in failure in the event of a new subgoal being found to already exist in the list.

31. (new) A computer program product according to any one of claims 25-30, wherein at least some of said certificates used in proving a determined trust chain as found have associated validity data, the method further comprising traversing the trust chain in a forwards direction from the trusted attribute delegation that grounds it and combining the validity data of all certificates involved to determine the validity of the overall attribute delegation represented by the chain.

32. (new) A computer program product according to claim 19, wherein determining that a trust chain has been found comprises storing the state of the seeking of a backwards proof prior to checking the validity of the trust chain found, this state being used to continue the process should the check of the validity of the initially found chain show that the chain is not valid.

33. (new) A computer program product according to any one of claims 25-32, wherein an attribute-delegation certificate used to prove a said subgoal has a subject-directed condition associated with it requiring that a specified subject must have a particular attribute in order for the delegation to be valid, and wherein seeking a backwards proof further comprises:

making said subject-directed condition a further subgoal to be proved for the current chain being followed.

34. (new) A computer program product according to claim 25, wherein the seeking of a backwards proof is run to completion to find all trust chains, if any, proving the primary goal.

35. (new) A computer program product according to any one of claims 25-30 and further for selecting certificates to be sent to a resource which requires proof that a subject has a particular attribute before allowing use of the resource, by:

finding a trust chain in respect of said subject and an issuer known, or likely, to be trusted by said resource; and

selecting for sending to said resource certificates associated with a trust chain, if any, thereby found.

36. (new) A computer program product according to any one of claims 25-30 and further for determining whether a resource requiring a user to have at least one predetermined attribute is usable by a subject presenting certificates to the resource, by:

finding a trust chain in respect of said subject and an issuer known and trusted by said resource; and

determining that use of the resource by the subject is permitted if a trust chain can be found.

filed, the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

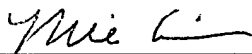
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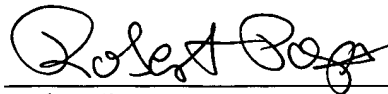


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Respectfully submitted,



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